

Application No. 09/905,051
 Reply to Office Action of August 10, 2005

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-3 (Canceled).

Claim 4 (Currently Amended): A video signal coding method comprising the steps of:

determining a coding difficulty level d of an input video signal for each unit of time;

measuring visual characteristics of the input video signal;

determining a reference value for allocating coding bits on the basis of temporally $b(d)$ for the amount of coding bits b allocated for each unit of time and related in advance to the coding difficulty level d of said input video signal for each unit of time;

determining an actual amount of allocated coding bits b_x on the basis of the reference value; and

generating coded data by coding the input video signal for each unit of time on the basis of said actual amount of allocated coding bits b_x , wherein part of the sum B_{av} of the amounts of allocated bits b_{av} per unit time for a certain period of time T_{vbr} , or

$$B_{av} = b_{av} \cdot T_{vbr} \quad B_{av} = b_{av} \times T_{vbr},$$

is stored as virtual buffer V_{vbr} in advance and the actual reference value of the amount of allocated coding bits b_{real} is obtained by

$$b_{real} = (B_{av} - V_{vbr}) / T_{vbr}$$

so that an amount of allocated bits not smaller than b_{real} is given as long as $V_{vbr} > 0$ but an amount smaller than b_{real} is given otherwise in said step of determining the actual amount of allocated coding bits on the basis of said reference value.

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Claim 5 (Original): The video signal coding method according to claim 4, wherein an upper limit is provided in advance according to the amount of allocated bits b_{av} when giving an amount of allocated bits exceeding said b_{real} .

Claim 6 (Original): The video signal coding method according to claim 4, wherein a lower limit is provided in advance according to the amount of allocated bits b_{av} when giving an amount of allocated bits smaller than said b_{real} .

Claim 7 (Original): The video signal coding method according to claim 4, wherein the upper limit is provided according to a proportion of scenes that are conspicuously degraded as a result of coding by taking the visual characteristics of the input image into consideration when giving an amount of allocated bits smaller than said b_{real} .

Claim 8 (Original): The video signal coding method according to claim 4, wherein, when the difference between the sum of the amounts of actually generated bits B_{gen} in the period of time and the sum of the amounts of available bits B_{av} in the period of time ($B_{av} - B_{gen}$) is positive when the coding operation in said period of time T_{vbr} is over, the difference is carried over and added to the sum of the amounts of available bits in the next period of time.

Claim 9 (Original): The video signal coding method according to claim 4, wherein, when the sum of the amounts of available bits exceeds R_{total} times of the initial sum B_{av} as a result of carrying over the difference, the reference value of the actually allocated bits per unit time b_{real} is raised according to the ratio.

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Claims 10-11 (Canceled).

Claim 12 ((Previously Presented): A video signal encoder comprising:

a means for determining a coding difficulty level d of an input video signal for each unit of time;

a means for measuring visual characteristics of the input video signal;

a means for determining a reference value for allocating coding bits on the basis of temporally $b(d)$ for the amount of coding bits b allocated for each unit of time and related in advance to the coding difficulty level d of said input video signal for each unit of time;

a means for determining an actual amount of allocated coding bits b_x on the basis of the reference value; and

a means for generating coded data by coding the input video signal for each unit of time on the basis of said actual amount of allocated coding bits b_x , wherein said means for determining the actual amount coding bits on the basis of the reference value controls the actual amount of allocated bits in such a way that the sum of the generated bits obtained when coding the input video signal for a certain period of time T_{vbr} does not exceed the amount of bits available for recording a signal having the length of the period of time T_{vbr} on a recording medium.

Claim 13 (Currently Amended): A video signal encoder comprising:

a means for determining a coding difficulty level d of an input video signal for each unit of time;

a means for measuring visual characteristics of the input video signal;

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a means for determining a reference value for allocating coding bits on the basis of temporally b(d) for the amount of coding bits b allocated for each unit of time and related in advance to the coding difficulty level d of said input video signal for each unit of time;

a means for determining an actual amount of allocated coding bits b_x on the basis of the reference value; and

a means for generating coded data by coding the input video signal for each unit of time on the basis of said actual amount of allocated coding bits b_x, wherein part of the sum B_{av} of the amounts of allocated bits b_{av} per unit time for a certain period of time T_{vbr}, or

$$B_{av} = b_{av} \cdot T_{vbr} \quad B_{av} = b_{av} \times T_{vbr},$$

is stored as virtual buffer V_{vbr} in advance and the actual reference value of the amount of allocated coding bits b_{real} is obtained by

$$b_{real} = (B_{av} - V_{vbr}) / T_{vbr}$$

so that an amount of allocated bits not smaller than b_{real} is given as long as V_{vbr} > 0 but an amount smaller than b_{real} is given otherwise in said step of determining the actual amount of allocated coding bits on the basis of said reference value.

Claim 14 (Original): The video signal encoder according to claim 13, wherein an upper limit is provided in advance according to the amount of allocated bits b_{av} when giving an amount of allocated bits exceeding said b_{real}.

Claim 15 (Original): The video signal encoder according to claim 13, wherein a lower limit is provided in advance according to the amount of allocated bits b_{av} when giving an amount of allocated bits smaller than said b_{real}.

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Claim 16 (Original): The video signal encoder according to claim 13, wherein the lower limit is determined as according to a proportion of scenes that are conspicuously degraded as a result of coding by taking the visual characteristics of the input image into consideration when giving an amount of allocated bits smaller than said b_real .

Claim 17 (Original): The video signal encoder according to claim 13, wherein, when the difference between the sum of the amounts of actually generated bits B_gen in the period of time and the sum of the amounts of available bits B_av in the period of time ($B_av - B_gen$) is positive when the coding operation in said period of time T_vbr is over, the difference is carried over and added to the sum of the amounts of available bits in the next period of time.

Claim 18 (Original): The video signal encoder according to claim 13, wherein, when the sum of the amounts of available bits exceeds R_total times of the initial sum B_av as a result of carrying over the difference, the reference value of the actually allocated bits per unit time b_real is raised according to the ratio.

Claim 19 (Previously Presented): A video signal coding method comprising the steps of:

utilizing a virtual buffer;

allocating an amount of information greater than b_real to an image showing a relatively high coding difficulty level, where b_real is obtained by

$$b_real = (B_av) \times (R_vbr); \text{ and}$$

controlling a bit rate based on an amount of residue, where the amount of residual is obtained by

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 $(b_real - b_av)x(T_vbr);$

wherein an amount of information smaller than b_real is allocated to an image showing a relatively low coding difficulty level.